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Subject: Assessment of Dwarf Mistletoe on PP in the Lost Creek Project
(Report # NE96-6)

To: District Ranger

On May 6, Rich Coakley, silviculturist on the Hat Creek RD and I examined the dwarf mistletoe infested ponderosa pine in the 200 acre Lost Creek Project. The project area is a pine site with scattered white fir that was thinned several times. Western dwarf mistletoe, Arceuthobium campylopodum, a parasitic plant infecting the residual pine, flourished after the thinnings. Most of the ponderosa pine trees are heavily infected with the disease. The conifers range in dbh from about 6 to 24 inches and in height from about 30 to 90 feet. A few sappling and pole sized ponderosa pine are scattered throughout the stand. There are a few pine seedlings in the openings that appear to be free of dwarf mistletoe.

Haworth dwarf mistletoe ratings on most of the pine range from 3 to 6. A few pine have low levels of dwarf mistletoe (rating less than or equal to 2). Most of the dwarf mistletoe in the overstory is confined to the lower 2/3 of the crowns. In the understory, the dwarf mistletoe is generally present throughout the crowns. Many of the heavily infested pine appear in poor health, with thin crowns and short leader growth.

The objective for this project is to regenerate the area with healthy pine. Two actions are being proposed at this time:

REMOVE ALL INFECTED PINE: Remove all the diseased pine, disk the soil to a depth of less than 6 inches to prepare a seedbed, and plant ponderosa pine. All the white fir will be retained.

LEAVE PINE SEED TREES: Remove all the diseased pine except for 6 to 7 seed trees per acre. The seed trees will be those with light or no dwarf mistletoe infections. Branches with dwarf mistletoe plants growing on them, may be pruned from the seed trees. The site will be disked to a depth of less than 6 inches and about 150 ponderosa pine seedlings will be planted per acre. The seed trees will provide seed to naturally reforest areas where planted trees do not survive. Dwarf mistletoe infected branches may be pruned from the seed trees to remove dwarf mistletoe plants that might infect healthy ponderosa pine seedlings. About five years after planting, when the seedlings are approximately three feet tall, the infected seed trees will be removed.

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DISCUSSION OF ALTERNATIVES:**NO ACTION**

Without treatment, the dwarf mistletoe infestation will worsen until most the pine have high levels of infection. This is because the pine is generally multistoried and dwarf mistletoe is in most of the overstory. The heavily infected pine will continue to decline in health, and some will die. A rule of thumb is that the dwarf mistletoe rating of a pine tree will increase by one point, every ten years. If so, essentially all the trees will have dwarf mistletoe rating of six in thirty years. This is the highest rating and the point at which the whole crown of a tree is infested with the parasite.

The growth of pine will decrease when the infestations become severe. The stressed pine will be susceptible to bark beetle attack, especially during droughts. When the dwarf mistletoe infestations become severe, much pine mortality can be expected during a bark beetle outbreak.

REMOVE ALL INFECTED PINE

By removing all the infected pine, and planting healthy seedlings, a healthy plantation can be established. Some of the ponderosa pine that is retained may contain latent dwarf mistletoe infections. These are young infections in the pine branches, that have not produced dwarf mistletoe plants at the time of treatment. To catch latent infections, the pine leave trees should be examined at three to five year intervals. If dwarf mistletoe is detected, the tree could be removed or killed, or the infected branches could be pruned. At any rate, it is undesirable to leave dwarf mistletoe in the overstory, after the young pine grow taller than about three feet, as these young pine present larger targets for the dwarf mistletoe seed.

In order to reduce the likelihood of annosus root disease in the area, it is recommended to treat all stumps with a borate compound. Sporax is the borate compound that is currently registered for this use in California. Another root disease that infects ponderosa pine is black stain. Little is known about the pathology of this fungus. Black stain is thought to be spread by root feeding insects. Since root disturbance may attract these insects, it is recommended that the proposed tilling not be done near the leave trees. And, the shallower the tilling, the better.

LEAVE PINE SEED TREES

This alternative is essentially the same as "Removing all Infected Pine". The only difference is that more pine with dwarf mistletoe will be retained in the overstory. It is good to prune the dwarf mistletoe from the leave trees. However, there will always be the possibility of latent infections. For this reason the overstory pine must be examined as in the previous alternative, and the dwarf mistletoe in the overstory should be eliminated when the seedlings grow large. Also, the same consideration should be given to root disease in this alternative as in the one above.

SUMMARY

The dwarf mistletoe in the Lost Creek Project area is serious. Without control, mortality from bark beetle attack could increase when many of the pine become stressed by the parasite. Regenerating a healthy pine stand will be possible with either of the proposed actions. With both alternatives, it is important to keep dwarf mistletoe out of the overstory, especially when the pine seedlings grow larger than about three feet tall. It is also important to treat the freshly cut stumps with a borate compound, and to keep the disking shallow and away from the leave trees, in order to reduce the likelihood of annosus or black stain root disease.

If you have any questions, or require further help, feel free to call me.



WILLIAM C. WOODRUFF
Plant Pathologist

